THE EFFECTS OF POTASSIUM PROMOTION ON THE CHARACTERISTICS OF IRON FISCHER-TROPSCH CATALYSTS. H. Arakawa and A. T. Bell. Materials and Molecular Research Division, Lawrence Berkeley Laboratory and Department of Chemical Engineering, University of California, Berkeley, CA 94720.

The addition of potassium is well known to alter the performance of iron catalysts used for Fischer-Tropsch synthesis. The objectives of this investigation were to characterize the dependence of the activity, selectivity, and stability of alumina-supported iron catalysts on the K/Fe ratio and to seek explanations for the influence of potassium on the catalysts performance. Experiments were conducted with 20% Fe/Al_2O_3 catalysts containing 0 to 1 % of potassium. With increasing potassium content the catalyst activity decreased, the olefin to paraffin ratio of the product increased substantially, the methane selectivity decreased, and the catalyst stability was enhanced. The interpretation of these results will be discussed in terms of the influence of potassium on the adsorption of H_2, CO, and CO_2, and infrared observations obtained under reaction conditions.